

July 25, 2005

TO: David Morris
FROM: S. Guduru
SUBJECT: Assessment of a daily 8-hour support at each of the 70M Antennas of Deep Space Network (DSN)'s to support Mars Science Laboratory (MSL) during the period November 2010 through October 2012.

Resource Allocation Planning Service (RAPS) performed a loading study to determine the ability of Deep Space Network to support a daily support of 8 hours for MSL at each of the 70M antennas individually during the period November 2010 through October 2012.

Assumptions

MSL is at Mars during the period in consideration.

There is no planned 70M antenna downtime in 2010- 2012. All 70M DSN resources are available during the study period.

Mars view period with a 6-degree mask is used for the study.

Mission Requirements

It is considered that MSL will require a daily support of 8 hours at the 70M for Surface Operations.

Analysis

Analysis was accomplished using the FASTER (forecasting and scheduling tool for earth-based resources) forecasting system and the updated mission set database for the August 2005 Resource Allocation review Board (RARB).

Since we do not know the Longitude at Mars that MSL will land, each DSN site was evaluated independently and the supportability for MSL at each of the 70M antennas (DSS-14, DSS-43 and DSS-63) is analyzed for the entire study period.

Supportability at Goldstone (GDSCC)

On an average MSL is over 85% supportable at GDSCC. But there are periods (as shown in Figure 1) when the supportability falls below 75%. Contention is mainly with DSS Maintenance compounded by Asteroid supports and occasional requests for supports greater than 24 hours by European and Global VLBI Systems (EGS). There are 2 to 3 supports per week for DSN Maintenance at GDSCC.

At certain periods in the study interval, although there is greater than 90% view period overlap with Sun, contention for MSL is reduced as the view period for MSL is greater than 12 hours at GDSCC.

Figure 1 shows the supportability for MSL and the view period overlap with Sun at GDSCC (DSS-14).

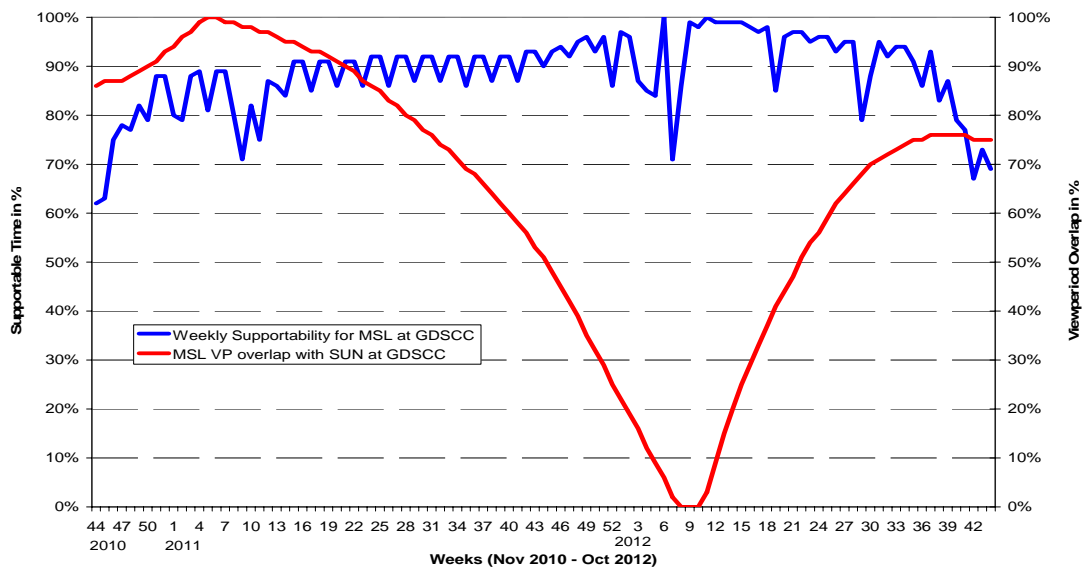


Figure 1 - MSL Supportability at Goldstone in 2010- 2012

Supportability at Canberra (CDSCC)

On an average MSL is over 96% supportable at CDSCC. Contention is greatly reduced due to long view periods for MSL at Canberra. There is only one DSN Maintenance support per week at CDSCC. Also there are no Goldstone Solar System Radar (GSSR) and 24-hour EGS supports currently planned at the 70M at CDSCC.

Figure 2 shows the supportability for MSL and the view period overlap with Sun at CDSCC (DSS-43).

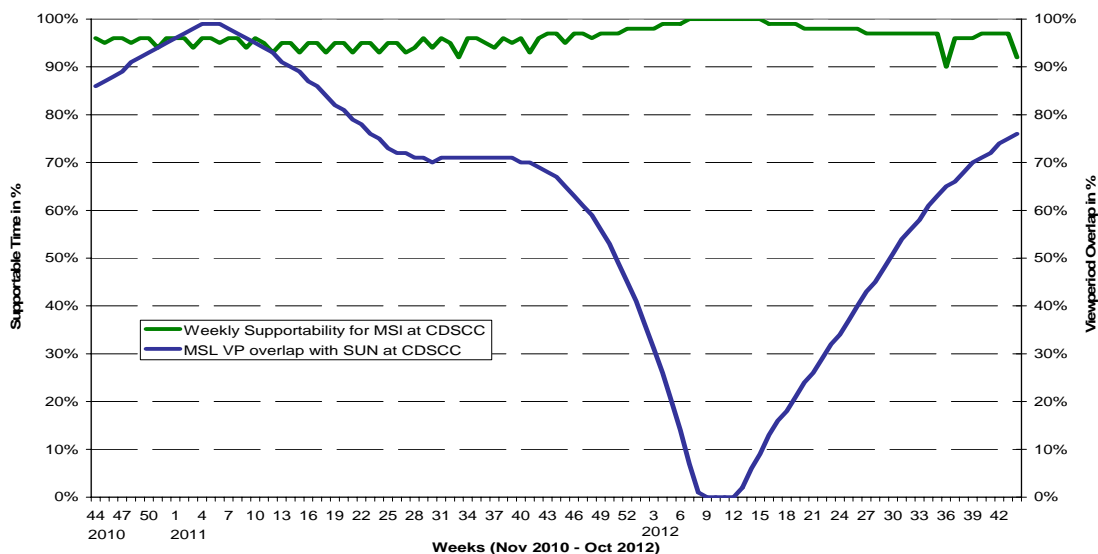


Figure 2 - MSL Supportability at Canberra in 2010- 2012

Supportability at Madrid (MDSCC)

On an average MSL is over 96% supportable at MDSCC. There are periods during the latter part of 2010 and 2012 when the supportability falls below 80%. Contention is mainly with DSS Maintenance compounded by less than 8-hour view periods for MSL during these periods. There are 2 passes per week that support DSN Maintenance and presently we do not support GSSR and 24-hour EGS activities at MDSCC.

Figure 3 shows the supportability for MSL and the view period overlap with Sun at MDSCC (DSS-63).

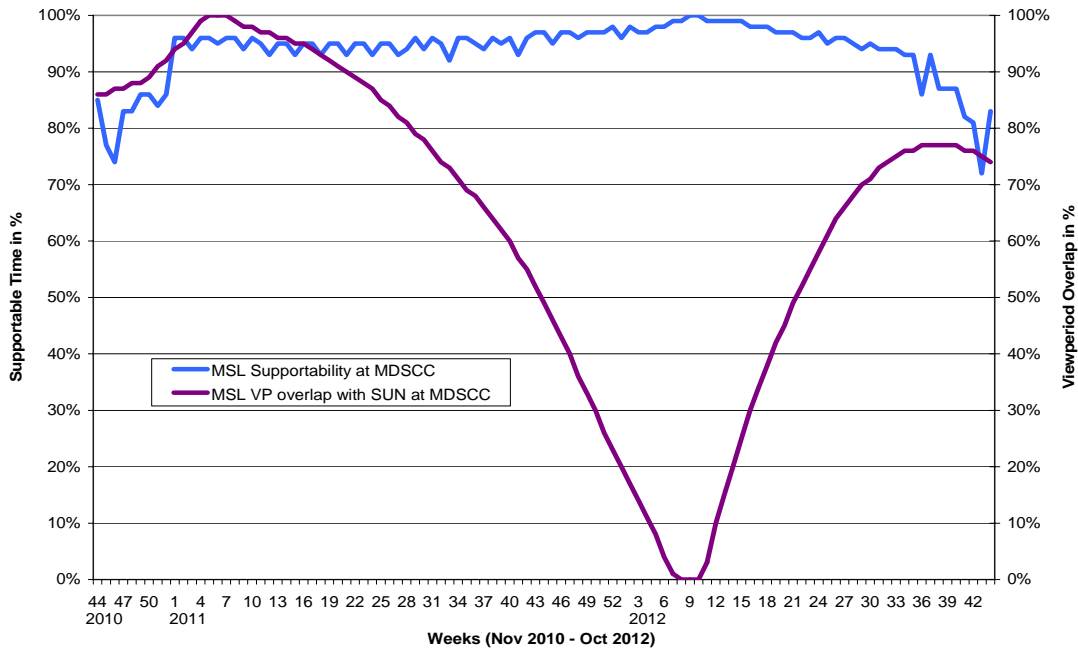


Figure 3 - MSL Supportability at Madrid in 2010- 2012

Conclusion

On an average MSL is more than 85% supportable at each of the DSN complexes. The supportability at CDSCC is better than GDSCC and MDSCC. The supportability at Madrid is more than 95% except during the latter part of 2010 and 2012 when MSL has less than 8 hours view at Madrid. MSL has least supportability at GDSCC compared to Canberra and Madrid. During certain periods supportability falls below 75%. Contention is mainly with DSS Maintenance compounded by Asteroid supports, occasional requests for supports greater than 24 hours by EGS and an extra DSN Maintenance support per week at GDSCC compared to CDSCC and MDSCC.

As always, the results of this study are preliminary in that network loading changes as requirements for planned missions are input and updated. We will continue to work with MSL and other users of the DSN to maximize the time available for each individual user.